

Work Order ID 133782 - 2

133782

Page 1

June-17-15 2:47:24 PM

Item ID: D6020-160
Revision ID:
Item Name: Crosstube Material

Accept

N9000040100

Setup Start *NS1*
Stop *NS2*

Start Date: 6/17/15 Start Qty: 21.00
Required Date: 12/21/15 Req'd Qty: 21.00
Reference:

21
21

Cust Item ID:
Customer:

Split
19x

Approvals: Process Plan: W Date: _____ Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start *NR1*
Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	Revision Nbr								
D6020	pa3								

110
110 PURCHASING 0.00
Purchasing
Purchasing Memo 0.00
Issue P/O: 299000
Manufacture as per dwg D6020

u 15.06.17 21

120
120 Receive & Inspect for Damage & Mat'l Certs 0.00
Packaging
Packaging Memo 0.00
Ensure material certification is attached

14x 80/6-07-03

130
130 QC6- Inspect dimensions to drawing 0.00
QC
Quality Control Memo 0.00
Ensure Material certification comply to Dwg

14

DAS
38
9-88

16-03-23

June-17-15 2:47:24 PM

Page 2

Setup	Start	*NS1*
	Stop	*NS2*

Cust Item ID:
Customer:

Reference:

Run	Start	*NR1*
	Stop	*NR2*

Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
---------	--------	-----------	------------	------------	---------------	-------------

0.00

Memo 0.00

Issue p/o: _____

Ensure Material certification

0.00

Issue p/o: _____
Ensure Material certification

Receive & Inspect for Damage & Mat'l Certs	0.00
--	------

0.00

Memo
Ensure Material certification

0.00

QC6- Inspect dimensions to drawing	0.00
------------------------------------	------

0.00

Memo	0.00
-------------	-------------

Quality Control

Work Order ID 133782

June-17-15 2:47:24 PM

133782

Page 3

Item ID: D6020-160 Accept ***N900040100*** Setup Start ***NS1***
 Revision ID: Stop ***NS2***
 Item Name: Crosstube Material
 Start Date: 6/17/15 Start Qty: 21.00 ***21*** Cust Item ID:
 Required Date: 12/21/15 Req'd Qty: 21.00 ***21*** Customer:
 Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
190	Identify as per dwg & Stock Location: <u>Shed</u>	0.00							
190									
Packaging	Memo	0.00							
Packaging	Tubes NOT Identified, CRATE Identified								
200	QC21- Final Inspection - Work Order Release	0.00							
200									
QC	Memo	0.00							
Quality Control									

Handwritten notes and signatures:
 TW 16-11-17
 16/11/21
 16-11-17

June-17-15 2:47:23 PM

Page 1

Work Order ID: 133782

Parent Item: D6020-160

Parent Item Name: Crosstube Material

133782

D6020-160

Start Date: 6/17/15**Required Date:** 12/21/15

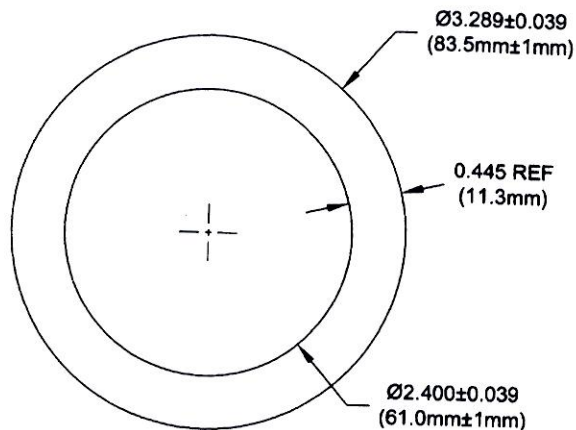
Start Qty: 21.00

Required Qty: 21.00

Comments: IPP REV:A 13.03.06 NEW ISSUE DD VERF:JLM

[illegible]

SPECIFICATION CONTROL DRAWING



NOTES

1) D6020-XXX CROSSTUBE

LENGTH

WHERE XXX IS LENGTH IN INCHES
EG. 160" LONG TUBE: D6020-160

2) MATERIAL: 17-4PH SEAMLESS STAINLESS STEEL TUBE PER ASTM A564
Ø3.289 O.D. x Ø2.400 I.D.

HEAT TREAT TO H1025 CONDITION (HRC 34-42):
MIN. ULTIMATE TENSILE STRENGTH = 155 ksi
MIN. YIELD TENSILE STRENGTH = 145 ksi

3) TOLERANCES ARE AS FOLLOWS:

ECCENTRICITY: 15% (+/-0.066" WALL)

LENGTH: XXX +0.188"/-0.000"

STRAIGHTNESS: 0.012" DEVIATION / 12" LENGTH

4) ALL DIMENSIONS ARE IN INCHES

5) TUBE MUST BE PICKLED OR ELECTROPOLISHED TO BE SMOOTH AND FREE FROM SCALE.

6) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.

W/O 133782

RELEASED
2013-08-16

A	NEW ISSUE	CP	13.04.24
REV.	DESCRIPTION	BY	DATE
DESIGN	<i>AP</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	<i>AP</i>		
CHECKED	<i>AP</i>	DRAWING NO.	REV. A
MFG. APPR.	<i>AP</i>	D6020	SHEET 1 OF 1
APPROVED	<i>AP</i>	TITLE	SCALE
DE APPR.	<i>AP</i>	CROSSTUBE MATERIAL	NTS
DATE	13.04.24	COPYRIGHT © 2013 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

PACKING LIST

TUBE HOLLOWS
INTERNATIONAL

World's leader in seamless precision

39 Enterprise Drive # 2 Windham, ME 04062
Phone 207.892.8899 Fax 207.892.8863

Packlist ID: 01609
Date: 1/29/2016
Page: 1

Sold To Address

DART AEROSPACE LTD.
1270 ABERDEEN ST.
HAWKESBURY K6A 1K7
CANADA

Ship To Address

DART AEROSPACE LTD.
1270 ABERDEEN ST.
HAWKESBURY K6A 1K7
CANADA

			CUSTOMER PO		PAYMENT TERMS		F.O.B.	
			28800		Net 30		WINDHAM	
SALES REP ID			SHIPPING METHOD		SHIP DATE		OUR ORDER NUMBER	
EVAN			JOURNEY FREIGHT		1/29/2016		DAR150141	
QUANTITY								
ORD	SHF	BCK	PART ID		DESCRIPTION			

21.00 14.00 5.00 CROSSTUBE

160" CROSSTUBE
Drawing: D6020-160P
Unit of Measure: EA
Legacy Part No.:

Rev No.:

14 PIECES OF THI SUPPLIED 17-4PH MATERIAL, MACHINED PER DRAWING# D6020 REV. A.

S/N 22 - 28, 31 - 37

RE: THI WO# 150624/01

THANK YOU FOR THIS ORDER.

RECEIVED BY: _____



STATEMENT OF CONFORMANCE

Dart Aerospace Ltd.
1270 Aberdeen
Hawkesbury, ON K6A 1K7

Part #: D6020-160P
Material: 17-4 PH
Report Serial #: See Table below
Heat #: See Table below
Drawing #: D6020 Rev. A
P.O #: PO28800 L/I 3
THI WO#: 150624/01
Qty: 14

Material Cert Report Serial Number:	Heat #:	Serial Number:
DNK-0066998-G22575-81386	G22575-NJAGHX	22, 23
DNK-0066998-G22184-81370	G22184	24, 25, 26
DNK-0066998-G22508-81371	G22508-NJAGKC	27, 28
DNK-0066998-G19957-81614	G19957	31
DNK-0066998-G22184-81896	G22184-NJAGKA	32, 33, 34, 35, 36, 37

The above-mentioned parts have been inspected and conform to customer contract, purchase order, drawing, and other required specifications. All exceptions are noted below. Inspection data and all certifications are kept on file and available for review upon customer request.

Comments: This is a partial shipment of line item 3 of this PO.
OAL of the following SN's are, SN 23 – 159.6", SN 24 – 159.7", SN 25 – 159.8",
SN 28 – 159.8", SN 32 – 159.8", SN 37 – 159.8".

Inspected / Certified By:

Christine Plummer

Christine Plummer, Quality Dept. January 29, 2016



Dunkirk Specialty Steel, LLC.
830 Brigham Road | Dunkirk, NY 14048
(716) 366-1000



Material Certification

MILL ORDER: 0066998
PART NUMBER: 72313.BO
P.O. NUMBER: 354505
SERIAL NUMBER: DNK-0066998-G22575-81386

Certificate of Conformance - Part 1 of 2
P.O. DATE: 9/8/2015

Part 1 - PAGE NUMBER: 1 of 1
PRINTED: 12/3/15 08:46

RE-CERTIFICATION - ADDED MATERIAL ID NUMBER

S A. M. CASTLE & CO.
O T 1420 KENSINGTON ROAD
L O SUITE 220
D OAK BROOK, IL 60523

S A.M. CASTLE & CO.
H T 299 CANAL ROAD
I O
P FAIRLESS HILLS, PA 19030

Material Description: STAINLESS STEEL ROUND BAR 17-4 EAF+AOD SOLUTION TREATED & AGED COND H1025 ROUGH TURNED ASTM A564-13 (type 630 condition H1025),

Size: 3.5000 DIAM X 160.0000 CUT-TO-LENGTH

Heat Number	TOP	W%	C	0.032	MN	0.79	SI	0.38	S	<0.001	P	0.022
G22575			CR	15.54	W	<0.05	V	0.07	NI	4.34	MO	0.27
			CO	0.05	CU	3.30	SN	0.009	PB		CB	0.24
			TA	<0.01	AL	0.08	TI	<0.01	FE		B	0.001
			O		MG		CA	0.001	SE		ZR	
			AG		BI		N	0.033	H		CQ	

HARDNESS: 348 HBW

HARDNESS1 35.8 HRC

TENSILE: DIR. T/S KSI 0.2% Y/S KSI %EL %R/A
LONG. 172.6 168.3 13.46 58.25

MACRO ETCH TEST: ACCEPTABLE

MATERIAL ID: NJAGHX

THIS MATERIAL WAS SOLUTION TREATED AT A TEMPERATURE OF 1900 °F/1 HR/AC + 1025 °F/4 HRS/AC

/S/ Amy Giordano

/S/ Kevin Seidel

Date: 12/03/15

Prepared by: Amy Giordano

Kevin Seidel, Technical Mgr.

Melted and manufactured in compliance with DFARS 252.225-7009 ALT 1. Melted and chemistry tested by USAP in Bridgeville, PA., USA. Material Manufactured in USA. Certification 1AW DIN 50 049/EN 10204 3.1. Material complies with EU directive 2002/95/EC (RoHS). The test results shown are certified to be a correct statement of records that were derived from testing samples of the material. Results meet applicable specifications. No welding was performed on the material supplied on this order. Material is free from mercury contamination. Material is of NAFTA origin. This material was produced under the Dunkirk Specialty Steel Quality Management System documented in QP Manual, Rev. 10 dated 3/11/2015, conforming to NCA-3800. Material testing was performed as applicable in accordance with ASTM A370, A604, E8, E10, E18, E23, E45, E112, E139, E381, E572, E1019, STP-CHEM-GDS, E1444, & AMS 2315. The recording of false, fictitious, or fraudulent statements on this document may be punished as a felony under federal statutes, including Federal Law, Title 18, Chapter 47. Test results are maintained in company records. This certification shall not be produced, except in full, without written approval of Dunkirk Specialty Steel. Material is free from Radioactive Contamination. Safety Data Sheets (SDS) are available at www.univstainless.com. If applicable: Decarb test - furnace atmosphere is Argon; Corrosion Test (ASTM A262 Practice A) - Etchant used -10% Oxalic Acid; Microstructure @ magnification 250 - 500X. Stress Rupture, Bending Test (ASTM 384), and Microcleanliness tests performed by Westmoreland Testing Laboratory or Element Materials Technology. Impact Testing and Corrosion Test (ASTM A262 Practice E) performed by the NSL Testing Laboratory, Westmoreland Testing Lab or Element Materials Technology. Unless otherwise stated, Percentage Elongation is measured in 4D. Speed of Testing: 0.005 in/in/min.; 0.05 in/in/min.



Certificate # L2370 Testing



Dunkirk Specialty Steel, LLC.

830 Brigham Road | Dunkirk, NY 14048

(716) 366-1000

Material Certification



Materials Testing Laboratory
Heat Treating

MILL ORDER: 0066998
PART NUMBER: 72313.BO
P.O. NUMBER: 354505
SERIAL NUMBER: DNK-0066998-G22184-81370

Certificate of Conformance - Part 1 of 2

Part 1 - PAGE NUMBER: 1 of 1

P.O. DATE: 9/8/2015

PRINTED: 12/2/15 12:00

S A. M. CASTLE & CO.
O T 1420 KENSINGTON ROAD
L O SUITE 220
D
OAK BROOK, IL 60523

S A.M. CASTLE & CO.
H T 299 CANAL ROAD
I O
P

FAIRLESS HILLS, PA 19030

Material Description: STAINLESS STEEL ROUND BAR 17-4 EAF+AOD SOLUTION TREATED & AGED COND H1025 ROUGH TURNED ASTM A564-13 (type 630 condition H1025),

Size: 3.5000 DIAM X 160.0000 CUT-TO-LENGTH

Heat Number	TOP	Wt	C	MN	SI	S	P
G22184			0.031	0.90	0.39	0.001	0.025
			CR 15.70	W <0.05	V 0.08	NI 4.20	MO 0.20
			CO <0.05	CU 3.24	SN 0.011	PB	CB 0.26
			TA <0.01	AL <0.01	TI <0.01	FE	B 0.001
			O	MG	CA	SE	ZR
			AG	BI	N 0.031	H	CQ

HARDNESS: 357 HBW

HARDNESS: 34.53 HRC

TENSILE: DIR. T/S KSI 0.2% Y/S KSI %EL %R/A
LONG. 174.1 169.6 14.46 58.72

MARCO ETCH TEST: ACCEPTABLE

THIS MATERIAL WAS SOLUTION TREATED AT A TEMPERATURE OF 1900 °F/1 HR/AC + 1025 °F/4 HRS/AC

Prepared by: Amy Giordano

/S/ Kevin Seidel

Date: 12/02/15

Prepared by: Amy Giordano

Kevin Seidel, Technical Mgr.

Melted and manufactured in compliance with DFARS 252.225-7009 ALT 1. Melted and chemistry tested by USAP in Bridgeville, PA., USA. Material Manufactured in USA. Certification IAW DIN 50 049/EN 10204 3.1. Material complies with EU directive 2002/95/EC (RoHS). The test results shown are certified to be a correct statement of records that were derived from testing samples of the material. Results meet applicable specifications. No welding was performed on the material supplied on this order. Material is free from mercury contamination. Material is of NAFTA origin. This material was produced under the Dunkirk Specialty Steel Quality Management System documented in QP Manual, Rev. 10 dated 3/11/2015, conforming to NCA-3800. Material testing was performed as applicable in accordance with ASTM A370, A604, E8, E10, E18, E23, E45, E112, E139, E381, E572, E1019, STP-CHEM-GDS, E1444, & AMS 2315. The recording of false, fictitious, or fraudulent statements on this document may be punished as a felony under federal statutes, including Federal Law, Title 18, Chapter 47. Test results are maintained in company records. This certification shall not be produced, except in full, without written approval of Dunkirk Specialty Steel. Material is free from Radioactive Contamination. Safety Data Sheets (SDS) are available at www.univstainless.com. If applicable: Decarb test - furnace atmosphere is Argon; Corrosion Test (ASTM A262 Practice A) - Etchant used -10% Oxalic Acid; Microstructure @ magnification 250 - 500X. Stress Rupture, Bending Test (ASTM 384), and Microcleanliness tests performed by Westmoreland Testing Laboratory or Element Materials Technology. Impact Testing and Corrosion Test (ASTM A262 Practice E) performed by the NSL Testing Laboratory, Westmoreland Testing Lab or Element Materials Technology. Unless otherwise stated, Percentage Elongation is measured in 4D. Speed of Testing: 0.005 in/in/min.; 0.05 in/in/min.

Material Certification

MILL ORDER: 0066998 Certificate of Conformance - Part 1 of 2 Part 1 - PAGE NUMBER: 1 of 1
PART NUMBER: 72313.B0
P.O. NUMBER: 354505 P.O. DATE: 9/8/2015 PRINTED: 12/2/15 12:04
SERIAL NUMBER: DNK-0066998-G22508-81371

S A. M. CASTLE & CO.
O T 1420 KENSINGTON ROAD
L O SUITE 220
D OAK BROOK, IL 60523

S A.M. CASTLE & CO.
H T 299 CANAL ROAD
I O
P FAIRLESS HILLS, PA 19030

Material Description: STAINLESS STEEL ROUND BAR 17-4 EAF+ACD SOLUTION TREATED & AGED COND H1025 ROUGH TURNED ASTM A564-13 (type 630 condition H1025),

Size: 3.5000 DIAM X 160.0000 CUT-TO-LENGTH

Heat Number	C	0.029	MN	0.70	SI	0.33	S	<0.001	P	0.023
G22508	CR	15.31	W	<0.05	V	0.09	NI	4.32	MO	0.34
	CO	0.07	CU	3.26	SN	0.010	PB		CB	0.24
	TA	<0.01	AL	0.08	TI	0.01	FE		B	0.001
	O		MG		CA		SE		ZR	
	AG		BI		N	0.028	H		CQ	

HARDNESS: 356 HBW

HARDNESS: 34.93 HRC

TENSILE: DIR. T/S KSI 0.2% Y/S KSI %EL %R/A
LONG. 173.1 168.4 13.58 58.67

MACRO ETCH TEST: ACCEPTABLE

MATERIAL ID: NJAGKC /

THIS MATERIAL WAS SOLUTION TREATED AT A TEMPERATURE OF 1900 °F/1 HR/AC + 1025 °F/4 HRS/AC



/S/ Amy Giordano

/S/ Kevin Seidel

Date: 12/02/15

Prepared by: Amy Giordano

Kevin Seidel, Technical Mgr.

Melted and manufactured in compliance with DFARS 252.225-7009 ALT 1. Melted and chemistry tested by USAP in Bridgeville, PA., USA. Material Manufactured in USA. Certification IAW DIN 50 049/EN 10204 3.1. Material complies with EU directive 2002/95/EC (RoHS). The test results shown are certified to be a correct statement of records that were derived from testing samples of the material. Results meet applicable specifications. No welding was performed on the material supplied on this order. Material is free from mercury contamination. Material is of NAFTA origin. This material was produced under the Dunkirk Specialty Steel Quality Management System documented in QP Manual, Rev. 10 dated 3/11/2015, conforming to NCA-3800. Material testing was performed as applicable in accordance with ASTM A370, A604, E8, E10, E18, E23, E45, E112, E139, E381, E572, E1019, STP-CHEM-GDS, E1444, & AMS 2315. The recording of false, fictitious, or fraudulent statements on this document may be punished as a felony under federal statutes, including Federal Law, Title 18, Chapter 47. Test results are maintained in company records. This certification shall not be produced, except in full, without written approval of Dunkirk Specialty Steel. Material is free from Radioactive Contamination. Safety Data Sheets (SDS) are available at www.univstainless.com. If applicable: Decarb test - furnace atmosphere is Argon; Corrosion Test (ASTM A262 Practice A) - Etchant used -10% Oxalic Acid; Microstructure @ magnification 250 - 500X. Stress Rupture, Bending Test (ASTM 384), and Microcleanliness tests performed by Westmoreland Testing Laboratory or Element Materials Technology. Impact Testing and Corrosion Test (ASTM A262 Practice E) performed by the NSL Testing Laboratory, Westmoreland Testing Lab or Element Materials Technology. Unless otherwise stated, Percentage Elongation is measured in 4D. Speed of Testing: 0.005 in/in/min.; 0.05 in/in/min.

Material Certification

MILL ORDER: 0066998
PART NUMBER: 72313.B0
P.O. NUMBER: 354505
SERIAL NUMBER: DNK-0066998-G19957-81614

Certificate of Conformance - Part 1 of 2
P.O. DATE: 9/8/2015

Part 1 - PAGE NUMBER: of 1
PRINTED: 12/12/15 12:19

S A. M. CASTLE & CO.
O T 1420 KENSINGTON ROAD
L O SUITE 220
D
OAK BROOK, IL 60523

S A. M. CASTLE & CO.
H T 299 CANAL ROAD
I O
P
FAIRLESS HILLS, PA 19030

Material Description: STAINLESS STEEL ROUND BAR 17-4 EAF+AOD SOLUTION TREATED & AGED COND H1025 ROUGH TURNED ASTM A564-13 (type 630 condition H1025),

Size: 3.5000 DIAM X 160.0000 CUT-TO-LENGTH

Heat Number	TOP	W%	C	MN	SI	S	P
G19957			0.030	0.72	0.33	0.002	0.020
			CR 15.35	W <0.05	V 0.07	NI 4.24	MO 0.30
			CO 0.05	CU 3.27	SN 0.006	PB	CB 0.24
			TA <0.01	AL <0.01	TI <0.01	FE	B 0.001
			O	MG	CA	SE	ZR
			AG	BI	N 0.025	H	CQ

HARDNESS: 345 HBW

HARDNESS: 34.9 HRC

TENSILE: DIR. T/S KSI 0.2% Y/S KSI %EL %R/A
LONG. 169.8 164.6 14.16 55.69

MACRO ETCH TEST: ACCEPTABLE

THIS MATERIAL WAS SOLUTION TREATED AT A TEMPERATURE OF 1025 °F/4 HRS/AC



/S/ Amy Giordano

/S/ Miles Voigt

Date: 12/12/15

Prepared by: Amy Giordano

Miles Voigt, Lab Supervisor

Melted and manufactured in compliance with DFARS 252.225-7009 ALT 1. Melted and chemistry tested by USAP in Bridgeville, PA., USA. Material Manufactured in USA. Certification IAW DIN 50 049/EN 10204 3.1. Material complies with EU directive 2002/95/EC (RoHS). The test results shown are certified to be a correct statement of records that were derived from testing samples of the material. Results meet applicable specifications. No welding was performed on the material supplied on this order. Material is free from mercury contamination. Material is of NAFTA origin. This material was produced under the Dunkirk Specialty Steel Quality Management System documented in QP Manual, Rev. 10 dated 3/11/2015, conforming to NCA-3800. Material testing was performed as applicable in accordance with ASTM A370, A604, E8, E10, E18, E23, E45, E112, E139, E381, E572, E1019, STP-CHEM-GDS, E1444, & AMS 2315. The recording of false, fictitious, or fraudulent statements on this document may be punished as a felony under federal statutes, including Federal Law, Title 18, Chapter 47. Test results are maintained in company records. This certification shall not be produced, except in full, without written approval of Dunkirk Specialty Steel. Material is free from Radioactive Contamination. Safety Data Sheets (SDS) are available at www.univstainless.com. If applicable: Decarb test - furnace atmosphere is Argon; Corrosion Test (ASTM A262 Practice A) - Etchant used -10% Oxalic Acid; Microstructure magnification 250 - 500X. Stress Rupture, Bending Test (ASTM 384), and Microcleanliness tests performed by Westmoreland Testing Laboratory or Element Materials technology. Impact Testing and Corrosion Test (ASTM A262 Practice E) performed by the NSL Testing Laboratory, Westmoreland Testing Lab or Element Materials technology. Unless otherwise stated, Percentage Elongation is measured in 4D. Speed of Testing: 0.005 in/in/min.; 0.05 in/in/min.



Certificate # L2370 Testing



Dunkirk Specialty Steel, LLC.

830 Brigham Road | Dunkirk, NY 14048

(716) 366-1000

Material Certification



Materials Testing Laboratory,
Heat Treating

MILL ORDER: 0366998
PART NUMBER: 72313.B0
P.O. NUMBER: 354505

SERIAL NUMBER: DNK-0066998-G22184-81896

Certificate of Conformance - Part 1 of 2

P.O. DATE: 9/8/2015

Part 1 - PAGE NUMBER: 1 of 1

PRINTED: 12/29/15 09:32

S A. M. CASTLE & CO.
O T 1420 KENSINGTON ROAD
L O SUITE 220
D OAK BROOK, IL 60523

S A. M. CASTLE & CO.
H T 299 CANAL ROAD
I O
P FAIRLESS HILLS, PA 19030

Material Description: STAINLESS STEEL ROUND BAR 17-4 EAF+AOD SOLUTION TREATED & AGED COND H1025 ROUGH TURNED ASTM A564-13 (type 630 condition H1025),

Size: 3.5000 DIAM X 160.0000 CUT-TO-LENGTH

Heat Number	TOP	Wt	C 0.031	MN 0.90	SI 0.39	S 0.001	P 0.025
G22184			CR 15.70	W <0.05	V 0.08	NI 4.20	MO 0.20
			CO <0.05	CU 3.24	SN 0.011	PB	CB 0.26
			TA <0.01	AL <0.01	TI <0.01	FE	B 0.001
			O	MG	CA	SE	ZR
			AG	BI	N 0.031	H	CQ

HARDNESS: 375 HBW

HARDNESS: 36.15 HRC

TENSILE: DIR. T/S KSI 0.2% Y/S KSI %EL %R/A
LONG. 174.6 168.7 14.99 56.13

MATCH TEST: ACCEPTABLE

MATERIAL ID: NJAGKA

THIS MATERIAL WAS SOLUTION TREATED AT A TEMPERATURE OF 1900 °F/1 HR/AC + 1025 °F/4 HRS/AC

6 PCS

/S/ Amy Giordano

/S/ Kevin Seidel

Date: 12/29/15

Prepared by: Amy Giordano

Kevin Seidel, Technical Mgr.

Melted and manufactured in compliance with DFARS 252.225-7009 ALT 1. Melted and chemistry tested by USAP in Bridgeville, PA., USA. Material Manufactured in USA. Certification IAW DIN 50 049/EN 10204 3.1. Material complies with EU directive 2002/95/EC (RoHS). The test results shown are certified to be a correct statement of records that were derived from testing samples of the material. Results meet applicable specifications. No welding was performed on the material supplied on this order. Material is free from mercury contamination. Material is of NAFTA origin. This material was produced under the Dunkirk Specialty Steel Quality Management System documented in QP Manual, Rev. 10 dated 3/11/2015, conforming to NCA-3800. Material testing was performed as applicable in accordance with ASTM A370, A604, E8, E10, E18, E23, E45, E112, E139, E381, E572, E1019, STP-CHEM-GDS, E1444, & AMS 2315. The recording of false, fictitious, or fraudulent statements on this document may be punished as a felony under federal statutes, including Federal Law, Title 18, Chapter 47. Test results are maintained in company records. This certification shall not be produced, except in full, without written approval of Dunkirk Specialty Steel. Material is free from Radioactive Contamination. Safety Data Sheets (SDS) are available at www.univstainless.com. If applicable: Decarb test - furnace atmosphere is Argon; Corrosion Test (ASTM A262 Practice A) - Etchant used -10% Oxalic Acid; Microstructure a magnification 250 - 500X. Stress Rupture, Bending Test (ASTM 384), and Microcleanliness tests performed by Westmoreland Testing Laboratory or Element Materials Technology. Impact Testing and Corrosion Test (ASTM A262 Practice E) performed by the NSI Testing Laboratory, Westmoreland Testing Lab or Element Materials Technology. Unless otherwise stated, Percentage Elongation is measured in 4D. Speed of Testing: 0.005 in/in/min.; 0.05 in/in/min.

EXTRUSION INSPECTION SHEET



TUBE #	TOTAL LENGTH	SIDE A		SIDE B		Measurement unit		Symbol		ULTRA SONIC MEASUREMENTS					
		DIA		DIA		INSIDE DIA	wall thickness measured w/vern	Strightness at 12" in middle	Rockwell Reading	LOCATION on tube	R1	R2	R3	R4	
		R1	R2	R1	R2										
DWG									N/A	Middle	N/A				
1	160"	3.323	3.327	3.325	3.324	2.364	0.480	0.493		N/A	Middle	.472	.474	.477	.474
2	160"	3.322	3.323	3.323	3.322	2.362	0.481	0.490		N/A	Middle	.473	.472	.474	.475
3										N/A	Middle				
4										N/A	Middle				
5										N/A	Middle				
6										N/A	Middle				
7										N/A	Middle				
8										N/A	Middle				
9										N/A	Middle				
10										N/A	Middle				
11										N/A	Middle				
12										N/A	Middle				
13										N/A	Middle				
14										N/A	Middle				
15										N/A	Middle				
16										N/A	Middle				
PART #		D6020-160				P/O#		28800		BATCH #		B133782		Notes:	

36
9-88
MAR 23 2016